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A new lichen, *Melanohalea subexasperata* (*Parmeliaceae*), from the Tibetan Plateau

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Abstract — A new *Melanohalea* species characterized by the presence of cortical hairs, *M. subexasperata,* is described from the Tibetan Plateau.

Keywords — Asia, China, lichenized fungi, taxonomy

Introduction

The lichen genera *Melanohalea* O. Blanco et al. and *Melanelixia* O. Blanco et al. in the *Parmeliaceae* were segregated from *Melanelia* Essl. based on molecular as well as chemical and morphological data (Blanco et al. 2004). *Melanohalea* is characterized by common pseudocyphellae, often on warts or isidial tips, and by a medulla containing depsidones or lacking secondary compounds (Blanco et al. 2004, Esslinger 1977). *Melanelixia* is characterized by often lacking pseudocyphellae and by containing lecanoric acid as the primary medullary constituent (Blanco et al. 2004, Esslinger 1977). Worldwide, *Melanelixia* includes nine known species, *Melanohalea* twenty species, and *Melanelia* still contains a heterogeneous residue of seventeen species (Esslinger 1977, 1978, 1987, 1992; Ahti et al. 1987, Egan 1987, Galloway & Jørgensen 1990, Thell 1995, Divakar et al. 2001, 2003; Blanco et al. 2004, Divakar & Upreti 2005, Wang et al. 2008).

Cortical hair is a very important taxonomic character in the brown parmelioid lichens. Produced by five *Melanelixia* species and three *Melanelia*

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species, the cortical hairs are lacking in all known *Melanohalea* species (Wang et al. 2008, 2009). However, during our study of the lichen flora of the Tibetan Plateau, an interesting *Melanohalea* species with cortical hairs new to science was found.

Materials and methods

The specimens studied were collected from the Tibetan Plateau, China, and are preserved in SDNU (Lichen Section of Botanical Herbarium, Shandong Normal University) and HKAS (Herbarium of Cryptogams, Kunming Institute of Botany Academia Sinica). The morphology of the lichen specimens was examined using a stereo microscope (COIC XTL7045B2) and a microscope (OLYMPUS CX21). Lichen substances in all specimens cited were identified using the standardized thin layer chromatography techniques (Culberson 1972). Photos of the thallus and cortical hairs were taken under OLYMPUS SZX12 with DP70 and OLYMPUS BX69.

Taxonomic description

Melanohalea subexasperata F.G. Meng & H.Y. Wang, **sp. nov.** Fig. 1

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Melanohalea subexasperata *tomentis corticibus a congeneribus diversa.*

Type collection: CHINA. Yunnan province, Shangri-la, Tianshengqiao, alt. 3500m, on twigs, H.Y. Wang, 20084032, 3 November 2008. (**Holotype** in SDNU).

Description —Thallus foliose, appressed throughout, adnate, 1.5–10 cm in diameter. Lobes 0.2–2 mm broad, 75–100 μm thick, flat, short, and slightly elongate, discrete to more often contiguous or subimbricate. Upper surface dark olive-brown, shiny at lobe ends, inward becoming dull; occasionally lightly pruinose, bearing small, hyaline cortical hairs, especially on the apothecial margins; without soredia, isidia or lobules, but with numerous, evenly scattered, conical to short-cylindrical papillae, each bearing a conspicuous pseudocyphella at the tip. Lower surface black, often paler at the margin; smooth to wrinkled, dull to slightly shiny; moderately rhizinate, the rhizines simple, concolorous with the lower surface, to 1mm long. Apothecia common, sessile to short stipitate, concave to flattening, mostly 2 mm in diameter; margin very soon developing pseudocyphellate papillae, nearly always bearing cortical hairs, often with rhizines; hymenium 30–45 μm thick, subhymenium 10–20 μm thick; spores 8, globose to ellipsoid, 8–10 × 6–8 μm, spore wall 1 μm thick. Pycnidia rare; conidia 7–8 ×1 μm, acerose to weakly fusiform.

Chemistry — Cortex K–, HNO_3–; medulla C–, K–, KC–, PD–; Constituents (8 specimens tested): no substances detected.

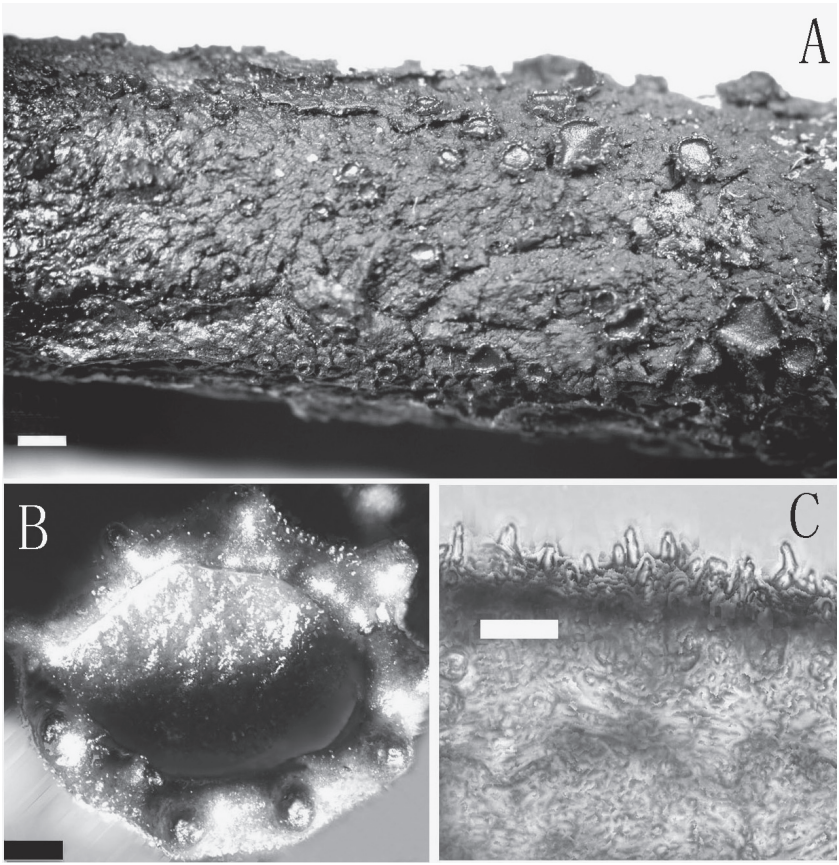

Fig. 1 Photographs of the holotype of *Melanohalea subexasperata*.
A. thallus (bar = 1mm). B. & C. showing cortical hairs on the apothecial margin
(B: bar = 100μm; C: bar = 20μm).

Distribution and substrate —*Melanohalea subexasperata* is a corticolous species, found in the southeast of the Tibetan Plateau at elevations of 2700–3500m.

Specimens examined —**CHINA. Yunnan: Shangri-la Co.** Tianshengqiao, alt. 3500m, on twigs, 3/xi/2008, *H.Y. Wang 20084031*, *20084032, 20084033, 20084034* (SDNU); Bitahai, alt. 3500m, on twigs, 21/x/1994, *L.S. Wang 9414984*, *9415513* (HKAS); **Sichuan**: **Kangding Co.** Paomashan alt. 2700m, on twigs, 3/xi/2008, *H.Y. Wang 20084076*, *20084078* (SDNU).

Comments —The presence of cortical hairs distinguishes *Melanohalea subexasperata* from all other *Melanohalea* species. A total of eight brown

parmelioid lichens have cortical hairs. They are *Melanelixia albertana*, *M. subargentifera*, *M. glabra*, *M. villosella*, *M. subvillosella*, *Melanelia fuscosorediata*, *M. piliferella*, and *M. pseudoglabra*. *Melanelixia* species all contain lecanoric acid, while the three *Melanelia* species with cortical hairs all contain gyrophoric acid. The molecular systematics indicates *Melanelia* species containing gyrophoric acid probably belong to *Melanelixia* (Wang et al. 2009), suggesting that all known species with cortical hairs are closely related. However, the lack of lichen substance and the presence of conspicuous pseudocyphella suggest *M. subexasperata* is the member of *Melanohalea* rather than *Melanelixia*. Furthermore, *Melanohalea subexasperata* closely resembles *Melanohalea exasperata* (De Not.) O. Blanco et al., which also has evenly scattered, conical, pseudocyphellate papillae and lacks soredia, isidia, lobules, and lichen substances. Although *M. subexasperata* is certainly related to *M. exasperata*, the former can be clearly separated from the latter by smaller lobes (0.2–2 mm vs. 1–6 mm broad), the thicker hymenium (twice the thickness of the subhymenium), and, of course, the presence rather than absence of cortical hairs. Except for *M. subexasperata*, *M. septentrionalis* (Lynge) O. Blanco et al. is the only known *Melanohalea* species where the hymenium is obviously thicker than the subhymenium. *Melanohalea septentrionalis* differs from *M. subexasperata* in the presence of fumarprotocetraric and protocetraric acids (PD+ orange) and the absence of papillae.

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